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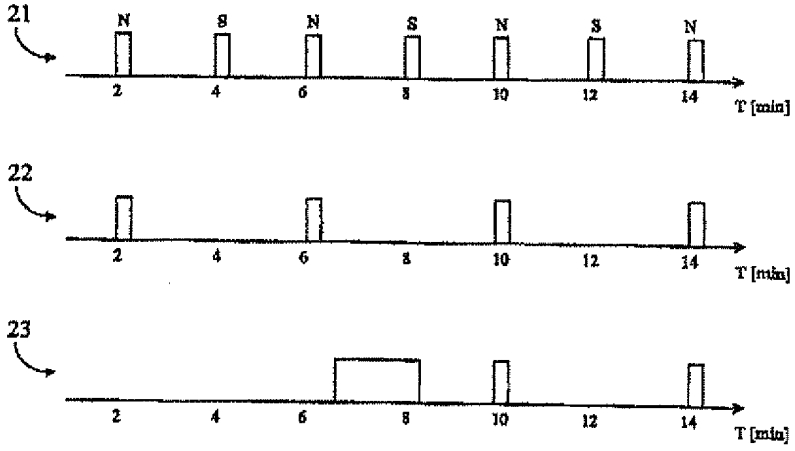
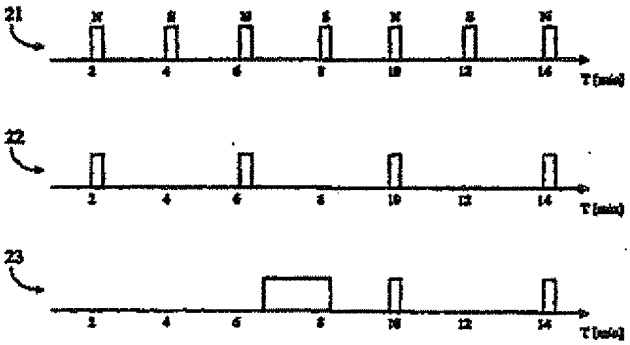
(54) **PROCEDE POUR FAIRE FONCTIONNER DES UNITES D'EMISSION ET DE RECEPTION DANS UN SYSTEME DE REGULATION POUR UNE OU PLUSIEURS PIECES D'UN BATIMENT**

(54) **METHOD FOR OPERATION OF TRANSMITTING AND RECEIVING DEVICES IN A CONTROL SYSTEM FOR ONE OR MORE ROOMS IN A BUILDING**



(57) L'invention concerne un procédé pour faire fonctionner des unités d'émission et de réception dans un système de régulation pour une ou plusieurs pièces d'un bâtiment. Afin d'assurer une activation optimale sur le plan énergétique de l'unité de réception ou de chaque unité de réception du système de régulation, l'unité de réception ou chaque unité de réception est activée avec un écart temporel prédéterminé, ce dernier étant synchronisé avec un cycle d'émission d'une unité d'émission correspondante. L'unité d'émission ou chaque unité d'émission transmet à cet effet un signal de synchronisation à l'unité de réception ou à chaque unité de réception, ledit signal contenant des informations sur l'écart temporel de signaux de données envoyés.

(57) The invention relates to a method for operating transmitter and receiver units in a control system for one or several rooms in a building. In order to ensure power-optimized activation for each receiver unit in the control system, one or each receiver unit is activated at a specific interval in time, whereby said interval in time is synchronized with a transmission cycle of a corresponding transmission unit. One or each transmission unit transmits a synchronization signal to one or each receiver unit, containing information relating to the interval in time when data signals are transmitted.



(57) Abstract

The invention relates to a method for operating transmitter and receiver units in a control system for one or several rooms in a building. In order to ensure power-optimized activation for each receiver unit in the control system, one or each receiver unit is activated at a specific interval in time, whereby said interval in time is synchronized with a transmission cycle of a corresponding transmission unit. One or each transmission unit transmits a synchronization signal to one or each receiver unit, containing information relating to the interval in time when data signals are transmitted.

Method for operation of transmitting and receiving devices in a control system for one or more rooms in a building

The invention relates to a method for operation of transmitting and receiving devices in a control system for one or more rooms in a building. ~~As claimed in the preamble of patent claim 1.~~

The temperature in one or more rooms in a building is normally controlled or regulated by means of control systems. The control systems have at least one control center and at least two components connected to the control center. The components include temperature regulators, heating devices, lighting devices and the like. The control center and the components have transmitting devices and/or receiving devices in order to interchange data between them.

To ensure reliable data interchange between the transmitting devices and the receiving devices, the receiving devices would in principle have to be switched on continuously, but this would result in a large amount of energy being consumed. This is particularly disadvantageous for battery-powered receiving devices since, in this case, the battery used to power the receiving device would be discharged within a short time.

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GB-A- 2 271 691 relates to a method for operation of transmitting and receiving devices under use of radio telemetry. This method uses periodic synchronisation. A „wake up" signal generated by a clock is transmitted to a switch in order to operate a microcomputer. This provides a periodic synchronisation between transmitting and receiving devices.

Against this background, the present invention is based on the problem of providing an energy-saving and efficient method for operation of transmitting and receiving devices in a control system for one or more rooms in a building.

In order to solve this problem, the method mentioned initially is distinguished by the features of claim 1.

Preferred developments of the invention result from the dependent claims and the description. An exemplary embodiment of the invention will be explained

in more detail in the following text with reference to the drawings, in which:

Figure 1 shows a block diagram of a control system, and

Figure 2 shows, in schematic form, activation states of a transmitting device and receiving device operated according to the invention.

The control system illustrated in figure 1 is used to regulate or control the temperature level individually in one or more rooms in a building. Furthermore, such a control system is also used to control the lighting and to control the roller shutters.

Figure 1 shows the layout of a control system with a control center 10 and a number of components. The control center 10 is also referred to as the apartment manager. The components comprise various assemblies. Temperature regulators 11 are thus provided, using which the temperature level in a room can be monitored, and which are used to adjust the temperature level setting via an appropriate adjusting element 12.

Heating devices 13 are also provided as components. Figure 1 shows, in schematic form, electronic radiator valves as heating devices 13, using which the heating power or heat emission from such radiators can be adjusted. However, it is possible to provide any desired heating devices. By way of example, figure 1 shows an underfloor heating regulator 14 for adjusting the heating power from an underfloor heating system.

Lighting devices 15 and roller shutters 16 are shown as further components in the control system. Furthermore, heating-cost distributors 17 are provided, using which the heating power produced by the heating devices 13 can be monitored and evaluated.

In the control system shown in figure 1, the components 11, 13, 14, 15, 16 and 17 are connected to

the control center 10 by radio. The control center 10 accordingly interchanges information or data with the components 11, 13, 14, 15, 16 and 17. The data interchange is indicated in figure 1 by arrows 18. The direction of the arrows 18 indicates the signal flow direction of the data signals between the components 11, 13, 14, 15, 16, 17 and the control center 10. This clearly shows that signal transmission is unidirectional in this case.

In order to transmit the signals, each component 11 and the control center 10 have associated transmitting devices 19. In order to receive signals, the components 13, 14, 15, 16, and the control center 10 have associated receiving devices 20. Reference should be made to the Patent Application submitted by the same applicant ~~and with the official reference 197 57 235~~, for details relating to the exact construction of the transmitting devices 19 and receiving devices 20, and with respect to collision-free signal transmission between the components 11, 13, 14, 15, 16, 17 and the control center 10. DE-A-19757235

The receiving devices 20 are activated, optimized to save energy, using the method according to the invention as described in the following text in conjunction with figure 2. Figure 2 thus shows three activation profiles 21, 22 and 23, in schematic form. The activation profile 21 is the activation profile for the transmitting devices 19. The activation profile 22 is an activation profile for the receiving devices 20 during so-called normal operation. The activation profile 23, on the other hand, is an activation profile for the receiving devices 20 during so-called synchronization operation.

As can be seen from figure 2, a receiving device 20 is not activated continuously, but for a predetermined time period at predetermined time intervals. The time activation profile 22 for a receiving device 20 in normal operation thus shows that

the receiving device 20, for example, is activated for a time period of, for example, 300 milliseconds every four minutes. These activation times for the receiving device 20 are synchronized to a transmission signal for data signals from a corresponding transmitting device 19. The data signals transmitted by the transmitting device 19 and which can be received by the receiving device 20 are denoted by N in the activation profile 21. Comparison of the activation profiles 21 and 22 immediately shows that the time interval and the time period for activation of the receiving device are synchronized to the time interval and the transmission duration of the data signals from the transmitting device 19.

For synchronizing, the transmitting device 19 transmits to the corresponding receiving device 20 a synchronization signal which is denoted by S in the time activation profile 21 in figure 2. For this purpose, the synchronization signal S includes information about the time interval between the data signals N transmitted by the transmitting device 19.

If the control system contains different transmitting devices and receiving devices, then, as a rule, they transmit and receive at different time intervals. The time intervals preferably depend on a unique appliance number. The logic association between the transmitting devices 19 and receiving devices 20 which communicate with one another is in this case produced by means of addresses which are included in the synchronization signal S and data signal N.

If, for example, as a result of a fault, the synchronization between the transmitting device 19 and the receiving device 20 is lost, or synchronization is required on starting up the control system, the receiving device 20 is operated in accordance with the time activation profile 23 in figure 2. In this case, a receiving device 20 thus remains activated until the receiving device 20 has received a corresponding

synchronization signal S. In order to ensure that the time period for synchronization is as short as possible, the synchronization signal S is, according to the invention, transmitted during the time interval of the transmitted data signals N, specifically at the halfway point during the time interval. This can be seen from the time activation profile 21 for the transmitting device 19 in figure 2. This shows that the data signals N are transmitted every four minutes. A synchronization signal is transmitted precisely halfway through these four minutes.

The method according to the invention thus allows the receiving devices/transmitting devices to be operated to optimize energy saving. If - as described in the example above - a receiving device is activated for 300 milliseconds only every four minutes, then this results in the energy consumption being 1/800th of the energy consumption which would be required if the receiving device were activated continuously.

List of reference symbols

10 Control center
11 Temperature regulator
12 Adjusting element
13 Heating device
14 Underfloor heating regulator
15 Lighting device
16 Roller shutter
17 Heating cost distributor
18 Arrow
19 Transmitting device
20 Receiving device
21 Activation profile
22 Activation profile
23 Activation profile

Patent Claims:

1. A method for operation of transmitting and receiving devices in a control system for one or more rooms in a building, comprising the following measures:

a) the or each transmitting device (20) transmits data signals (N), to be received by the or each receiving device (19), in a predetermined transmission cycle, specifically with a predetermined time interval and with a predetermined transmission duration,

b) the or each receiving device (19) is activated at a predetermined time interval and for a predetermined time period, with the time interval and the time period for the or each receiving device (19) being synchronized to the transmission cycle of the or each transmitting device (20),

c) the or each transmitting device (20) transmits a synchronization signal (S), in addition to data signals (N), to the or each corresponding receiving device (19), with the synchronization signal (S) including information about the time interval between the transmitted data signals (N),

d) the transmitting devices (20) and receiving devices (19) which communicate with one another are allocated via addresses which are included in the synchronization signal (S) and data signal (N).

2. The method as claimed in claim 1, **wherein** the synchronization signal (S) is transmitted at the halfway point during the time interval of the transmitted data signals (N).

3. The method as claimed in claim 1 or 2, **wherein**, for synchronization, the or each receiving device (19) is activated until it receives the corresponding

synchronization signal (S) from the corresponding transmitting device (20).

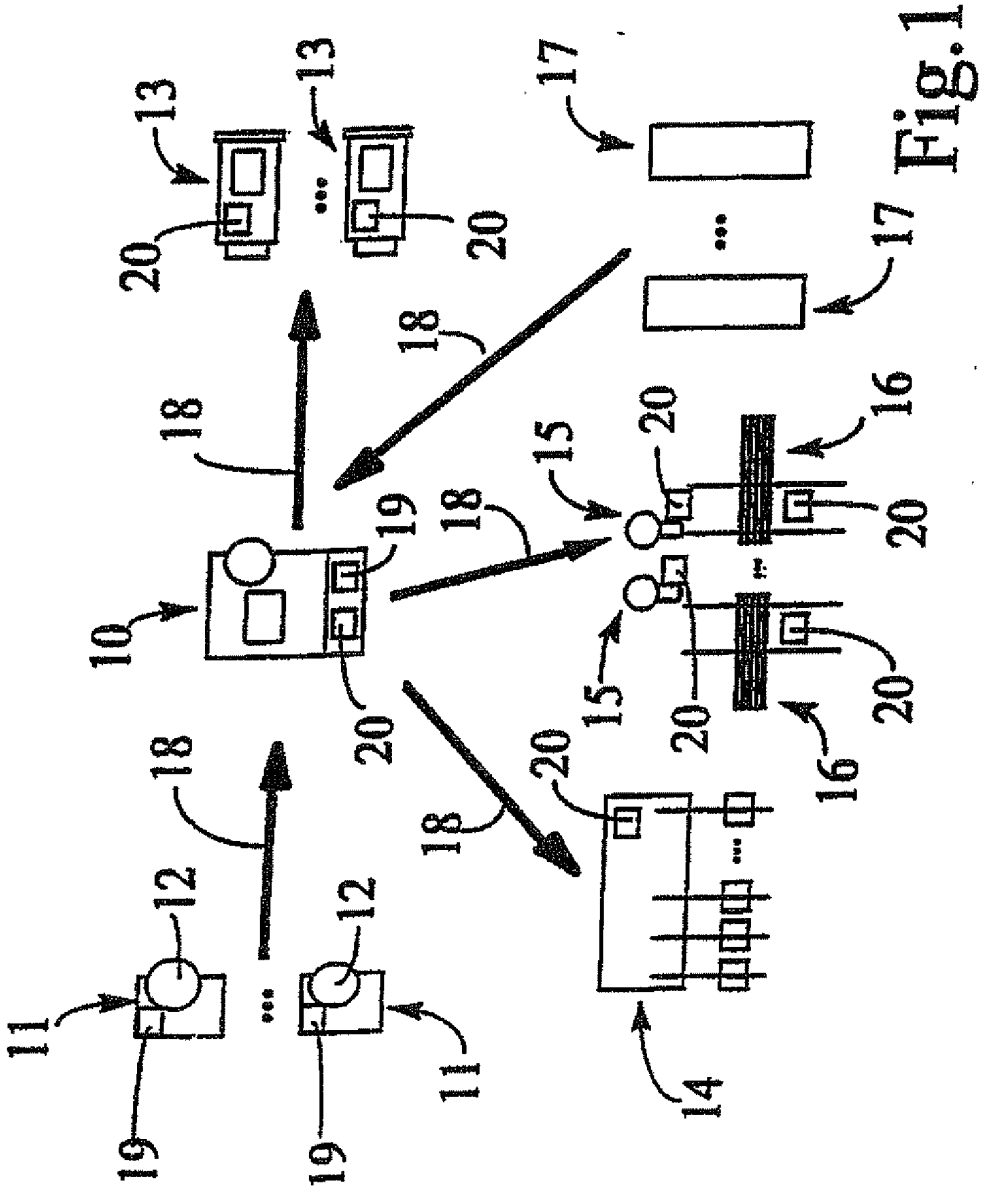


Fig. 1

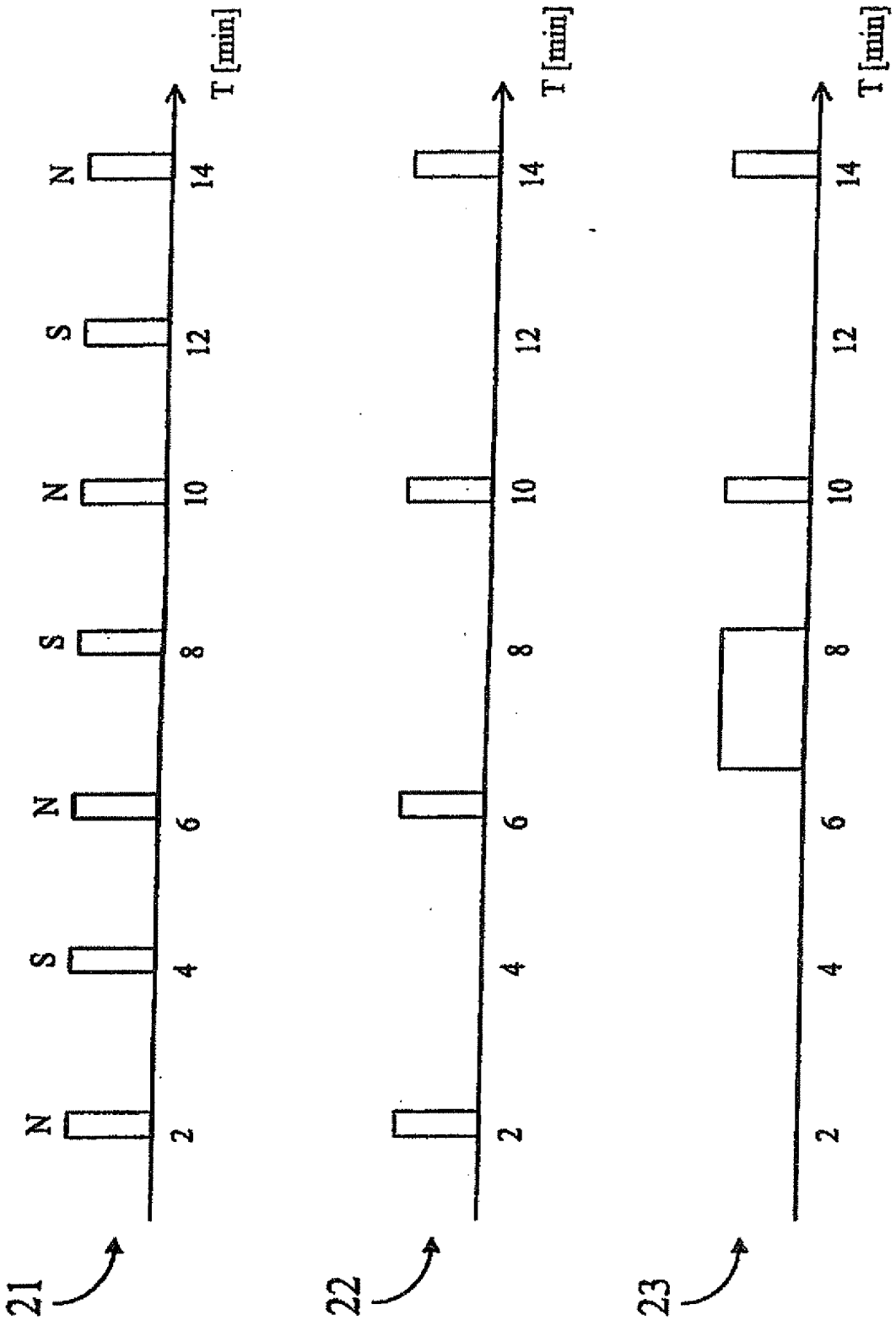
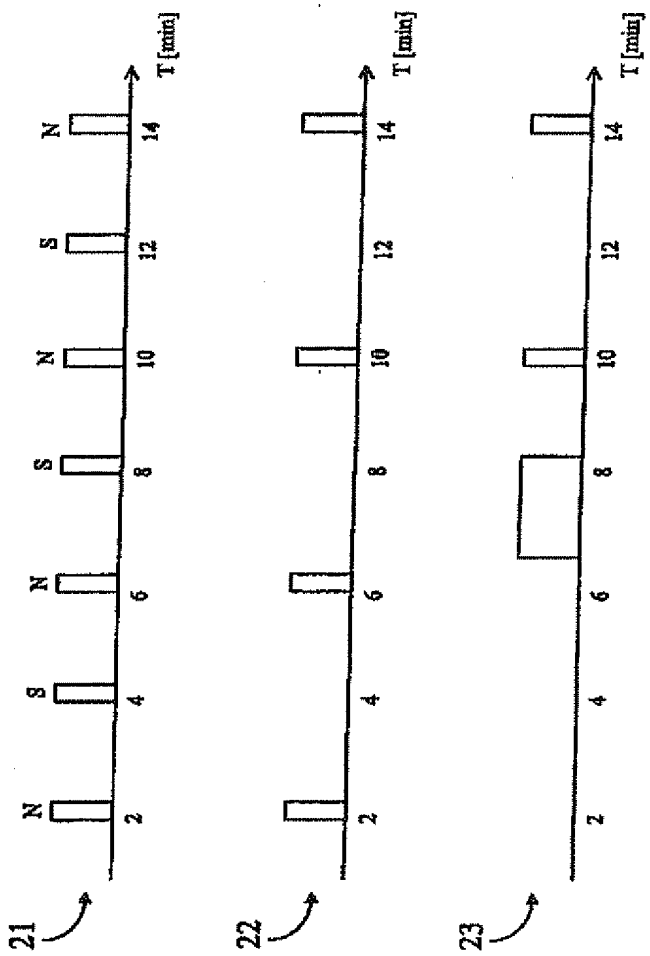


Fig. 2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